CLASS : IX

SUMMATIVE ASSESSMENT - I

Medium : ENGLISH

PAPER : I

MATHEMATICS

Principles of Valuation (Key)

Section - I

1. An Irrational number between 4 and 5 is
$$\left.\begin{aligned}\sqrt{ab} &= \sqrt{4\times5} = \sqrt{4}\times\sqrt{5}\\ &= 2\sqrt{5}\end{aligned}\right\}\text{ 1 Mark}$$

2.
$$\left.\begin{aligned}(\sqrt{3}+\sqrt{2})^2 &= (\sqrt{3})^2+(\sqrt{2})^2+2\sqrt{3}\,\sqrt{2}\\ &= 3+2+2\sqrt{6}\\ &= 5+2\sqrt{6}\end{aligned}\right\}\text{ 1 mark}$$
$5+2\sqrt{6}$ is also an irrational number.

3.
$$\left.\begin{aligned}\text{Let } P(x) &= x^2+2x-15\\ P(3) &= 3^2+2(3)-15\\ &= 9+6-15\\ &= 15-15 = 0\end{aligned}\right\}\text{ 1 mark}$$
If $P(3)=0$, 3 is a zero of Polynomial

4. Let Kohli scored runs be $= x$ say

Lakshman scored runs $= x+10$ $\;\; \frac{1}{2}$

Sum of their scores $= x+x+10 = 2x+10$

by the problem sum of their scores $= 140$ $\;\; \frac{1}{2}$

$\therefore\ 2x+10 = 140$

1 mark

(contd...)

Section - II

5.

2	5. 000000 ...	2.236
	4	
42	100	
	84	
443	1600	
	1329	
4466	27100	
	26796	
	304	

$1\frac{1}{2}$

$\therefore \sqrt{5} = 2.236$ $\frac{1}{2}$

2 mark

6.

$$102 \times 98 = (100+2)(100-2)$$
$$= (100)^2 - (2)^2 \quad \left(\because (a+b)(a-b) = a^2-b^2\right) \quad 1$$
$$= 10000 - 4$$
$$= 9996 \quad 1$$

2 marks

7. Let No. of Pencils Purchased by Ravi $= x$ 1

No. of Pens Purchased by Ravi $= y$

Cost of each pencil = Rs 3.

Cost of each Pen = Rs. 20 1 mark

Cost of 'x' Pencils = Rs. $3x$

Cost of 'y' Pens = Rs. $20y$.

Total cost of Pencils and Pens = $3x + 20y$.

by the Problem Ravi Paid for Pencils and Pens = Rs. 150 1 mark

$\therefore 3x + 20y = 150$

2 marks

8. Let l, b length and breadth of a rectangle

Area of the rectangle = lb

by the Problem Area of the rectangle = x^2-3x+2 $\frac{1}{2}$

$$\therefore \; l\times b = x^2-3x+2$$
$$= x^2-2x-x+2$$
$$= x(x-2)-1(x-2)$$
$$= (x-1)(x-2)$$

Length = $x-1$, breadth $x-2$ 1 mark

Let x must be greater than 2

If $x=3$, $l = 3-1=2$, $b=3-2=1$ $\frac{1}{2}$ m

$x=4$ $l=4-1=3$ $b=4-2=2$

2 m

9. Let l, b length and breadth of a rectangle

Area of the rectangular part = $l\times b$

Perimeter of a rectangular part = $2(l+b)$ $\frac{1}{2}$ m

by the Problem, Area of the Problem = 180 m^2

$$l\times b = 180$$
$$l\times 5\sqrt{3} = 180$$
$$\therefore\; l = \frac{\cancel{180}\,36\times\sqrt{3}}{\cancel{5}\sqrt{3}\times\sqrt{3}} = \frac{\overset{12}{\cancel{36}}\sqrt{3}}{\cancel{3}} = 12\sqrt{3}$$ $\frac{1}{2}$

$$\text{Perimeter} = 2(l+b)$$
$$= 2(12\sqrt{3}+5\sqrt{3})$$
$$= 2(17\sqrt{3})$$
$$= 34\sqrt{3}\ m.$$ 1 m.

2 M

Section - III

10) (a) $$\frac{\sqrt{5}+\sqrt{3}}{2\sqrt{5}-3\sqrt{3}} = a - b\sqrt{15}$$

The rationalising factor of $2\sqrt{5}-3\sqrt{5}$ is $2\sqrt{5}+3\sqrt{3}$ } 1 m
multiply both numerator and denominator by $2\sqrt{5}+3\sqrt{3}$

$$\frac{\sqrt{5}+\sqrt{3}}{2\sqrt{5}-3\sqrt{3}} \times \frac{2\sqrt{5}+3\sqrt{3}}{2\sqrt{5}+3\sqrt{3}} = a - b\sqrt{15}$$

$$\frac{2(\sqrt{5})^2+2\sqrt{3}\times\sqrt{5}+3\sqrt{3}\times\sqrt{5}+3\sqrt{3}\times\sqrt{3}}{(2\sqrt{5})^2-(3\sqrt{3})^2} = a - b\sqrt{15}$$ } 1m

$$\frac{2\times5+2\sqrt{15}+3\sqrt{15}+3\times3}{20-27} = a - b\sqrt{15}$$

$$\frac{10+5\sqrt{15}+9}{-7} = a - b\sqrt{15}$$ } 1m

$$-\frac{19}{7} - \left(\frac{5\sqrt{15}}{7}\right) = a - b\sqrt{15}$$

$$\therefore a = \frac{-19}{7}, \quad b = \frac{5}{7}$$ } 1m

4 marks

(b) $$f(x) = 2x^3 - 3x^2 + ax - b$$

'0' and '1' are the zeroes of the Polynomial } 1 mark
then $f(0) = 0$ and $f(1) = 0$

$$\therefore f(0) = 2(0)^3 - 3(0)^2 + a(0) - b = 0$$
$$= 0 - 0 + 0 - b = 0$$ } 1 mark
$$\therefore b = 0$$

$$f(1) = 2(1)^3 - 3(1)^2 + a(1) + b = 0$$
$$= 2 - 3 + a + b = 0$$
$$-1 + a + b = 0 \quad \Big\} \text{ 1m}$$

$$a + b = 1$$
Put $b = 0 \Rightarrow a = 1$ } 1m
$$\therefore \quad a = 1, \; b = 0$$

4 marks

(11) (a) Let $P(x) = x^3 + ax^2 + 5$ and
$$q(x) = x^3 - 2x^2 + a.$$
$P(x)$ and $q(x)$ are divided by $x+2$ leave the Same remainder } 1m

If $P(x)$ is divided by remainder is $P(-2)$
$q(x)$ is divided by remainder is $q(-2)$ } 1m
$$\therefore \quad P(-2) = q(-2)$$
$$(-2)^3 + a(-2)^2 + 5 = (-2)^3 - 2(-2)^2 + a$$
$$-8 + 4a + 5 = -8 - 8 + a \quad \Big\} \text{ 1m}$$
$$4a - 3 = -16 + a$$
$$4a - a = -16 + 3$$
$$3a = -13$$
$$\therefore \quad a = \frac{-13}{3} \quad \Big\} \text{ 1m}$$

4m

(b) Given equation is $3x+4y = k$

If $x=2$ and $y=1$ are Solution of $3x+4y=k$ } 1 mark

$$\Rightarrow 3(2) + 4(1) = k$$
$$6 + 4 = k$$
$$10 = k$$
} 1 mark

$\therefore k = 10$

Resultant equation is $3x+4y = 10$

If $x=1 \Rightarrow 3(1) + 4y = 10$
$$3 + 4y = 10$$
$$4y = 7$$
$$\therefore y = \frac{7}{4}$$
} 1 mark

$\therefore x=1, y=\frac{7}{4}$

If $x=3 \Rightarrow 3(3) + 4y = 10$
$$9 + 4y = 10$$
$$4y = 1$$
$$\therefore y = \frac{1}{4}$$
} 1 mark

$x=3, y=\frac{1}{4}$.

4 marks

12) (a) Let $P(x) = 2x^4 - 6x^3 + 3x^2 + 3x - 2$

to show $x^2 - 3x + 2$ is a factor of $P(x)$

then x^2-3x+2 divided into two factors.

$$\therefore x^2 - 3x + 2 = x^2 - 2x - x + 2$$
$$= x(x-2) - 1(x-2)$$
$$= (x-1)(x-2)$$
} 1 mark

If x^2-3x+2 is a factor of $P(x)$, to show that $(x-1)$ and $(x-2)$ also factors of $P(x)$.

If $(x-1)$ is a factor of $P(x)$ then $P(1)=0$ — 1 Mark

$$P(1) = 2(1)^4 - 6(1)^3 + 3(1)^2 + 3(1) - 2$$
$$= 2 - 6 + 3 + 3 - 2$$
$$= 0$$

$\therefore P(1)=0$, $(x-1)$ is a factor of $P(x)$

If $(x-2)$ is a factor of $P(x)$, then $P(2)=0$ — 1 Mark

$$P(2) = 2(2)^4 - 6(2)^3 + 3(2)^2 + 3(2) - 2$$
$$= 32 - 48 + 12 + 6 - 2$$
$$= 50 - 50$$
$$= 0$$

$\therefore P(2)=0$, $(x-2)$ is a factor of $P(x)$

$\therefore (x-1)$ and $(x-2)$ both are factors of $P(x)$ then Product of its x^2-3x+2 is also factor of $P(x) = 2x^4 - 6x^3 + 3x^2 + 3x - 2$ — 1 Mark

4 Marks

(b) Equation is $x+2y=4$

(i) $(0, \frac{4}{2}) \Rightarrow$ LHS $= 0 + \cancel{2}(\frac{4}{\cancel{2}})$

$= 0 + 4 = 4$

RHS $= 4$

$\therefore (0, \frac{4}{2})$ is solution of $x+2y=4$ — 1 mark

(ii) $\left(\frac{8}{2}, 0\right) \Rightarrow LHS = \frac{\cancel{8}^{4}}{\cancel{2}} + 2(0)$

$= 4 + 0 = 4$

$RHS = 4$

$\therefore LHS = RHS$

$\therefore \left(\frac{8}{2}, 0\right)$ is solution of $x + 2y = 4$

1 Mark

(iii) $(-2, 3) \Rightarrow LHS = (-2) + 2(3)$

$= -2 + 6$

$= 4$

$RHS = 4$

$\therefore LHS = RHS$

$\therefore (-2, 3)$ is solution of $x + 2y = 4$

1 mark

(iv) $(\sqrt{2}, 2\sqrt{3}) \Rightarrow LHS = \sqrt{2} + 2(2\sqrt{3})$

$= \sqrt{2} + 6\sqrt{3}$

$RHS = 4$

$\therefore LHS \neq RHS$

$\therefore (\sqrt{2}, 2\sqrt{3})$ is not a solution of $x + 2y = 4$

1 mark

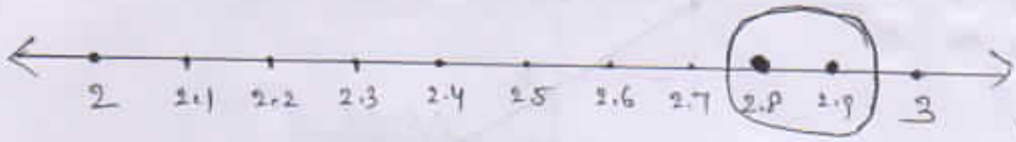
4 marks

(13) (a) 2.884 lies between 2 and 3 on a number line

Step: 1

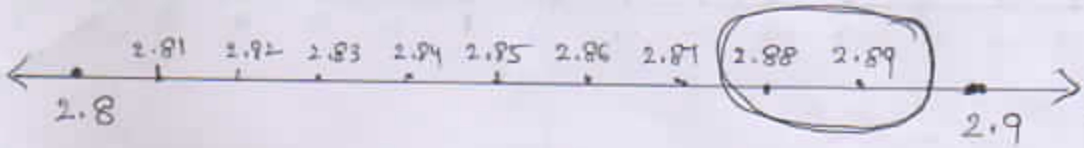
1 mark

Step 2 :- 2.884 lies between 2.8 and 2.9



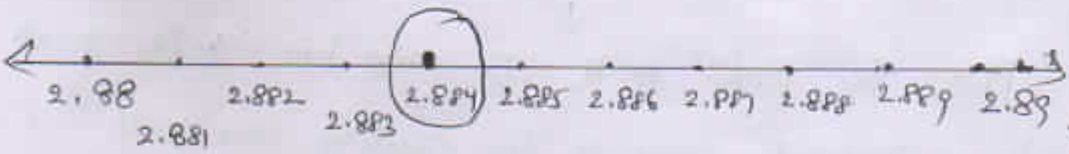
1m

Step 3, 2.884 lies between 2.88 and 2.89



1m

Step :4 2.884 lies between 2.88 and 2.89



1mark

4marks

13) (b)

The equation is $2x + 3y = 11$

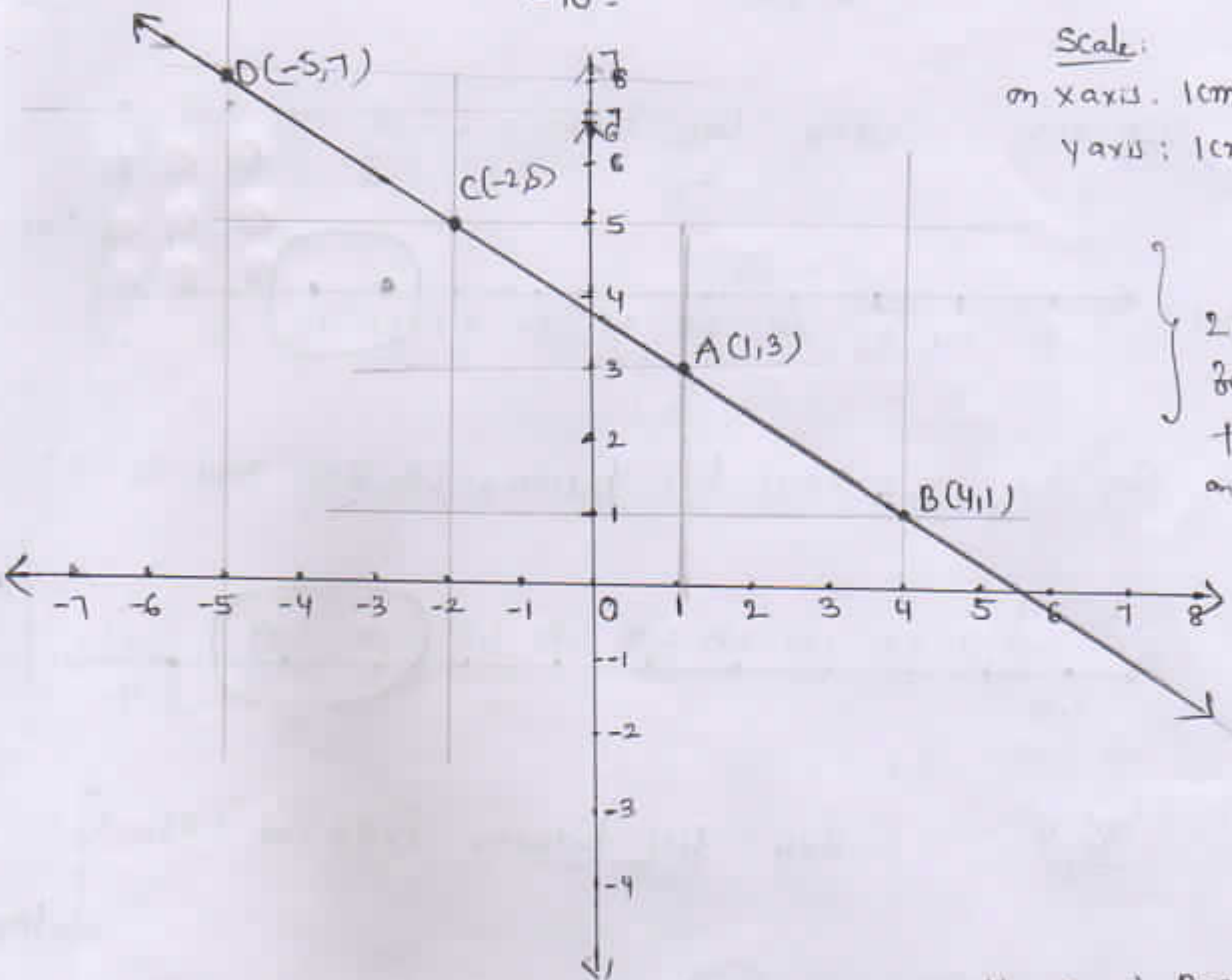
$$3y = 11 - 2x$$

$$\Rightarrow y = \frac{11-2x}{3}$$

Solution Table.

1 $\frac{1}{2}$ mark

x	$y = \frac{11-2x}{3}$	(x,y)	Point
1	3	(1,3)	A
4	1	(4,1)	B
−2	5	(−2,5)	C
−5	7	(−5,7)	D



Scale:
on x axis. 1cm = 1unit
y axis : 1cm = 1unit

2 marks for drawing the graph and plot the points

Plot the points A, B, C, D and join on the graph paper.
is required graph of the equation $2x+3y=11$.
where $x=1$ then $y=3$.

$\frac{1}{2}$ mark

4 marks

=

PART- B $20\times\frac{1}{2} = 10$ marks

14)	B.	19.	C	24.	C	29.	A
15)	D	20.	C	25.	D	30.	A
16)	C	21.	D	26.	C	31.	A
17.	D	22.	A	27.	D	32.	B
18.	C	23.	B	28.	A	33.	A